



ATSC/DVB-3/M

2U Digital Audio Speaker Monitor

with HD/SD-SDI, AC-3, and AES Inputs/Outputs
on XLR/BNC, Analog Output of Selected on XLR,
Six 53-Segment Level Meters, Left/Right Source
Selection or Six Channel Mix, Status LEDs,
Headphone Output, and Phase Indication

(Document P/N 821650, Rev-B)

User Manual

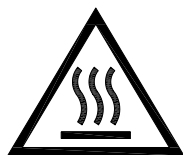
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Important Safety Instructions

- 1) Read these instructions.
- 2) Keep these instructions.
- 3) Heed all warnings.
- 4) Follow all instructions.
- 5) Do not use this apparatus near water.
- 6) Clean only with dry cloth.
- 7) Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
- 8) Do not install near any heat source such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- 9) Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- 10) Protect the power cord from being walked on or pinched, particularly at plugs convenience receptacles and the point where they exit from the apparatus.
- 11) Only use attachments/accessories specified by the manufacturer.
- 12) Use only with the cart stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
- 13) Unplug this apparatus during lightning storms or when unused for long periods of time.
- 14) Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as when power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- 15) Do not expose this apparatus to rain or moisture.
- 16) The apparatus shall be connected to a mains socket outlet with a protective earthing connection.

CAUTION!



In products featuring an audio amplifier and speakers, the surface at the side of the unit, where the audio amplifier heat sink is internally attached, may get very hot after extended operation. When operating the unit exercise caution when touching this surface and ensure that external materials which may be adversely affected by heat are not in contact with it. There is a Hot Surface label (see diagram) attached to the aforementioned surface of the product.

Introduction

Congratulations on your selection of a Wohler Technologies product. We are confident it represents the best performance and value available, and we guarantee your satisfaction with it.

If you have questions or comments you may contact us at:

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Section 1

General Features and Specifications

Description
Features
Applications
Specifications
Installation

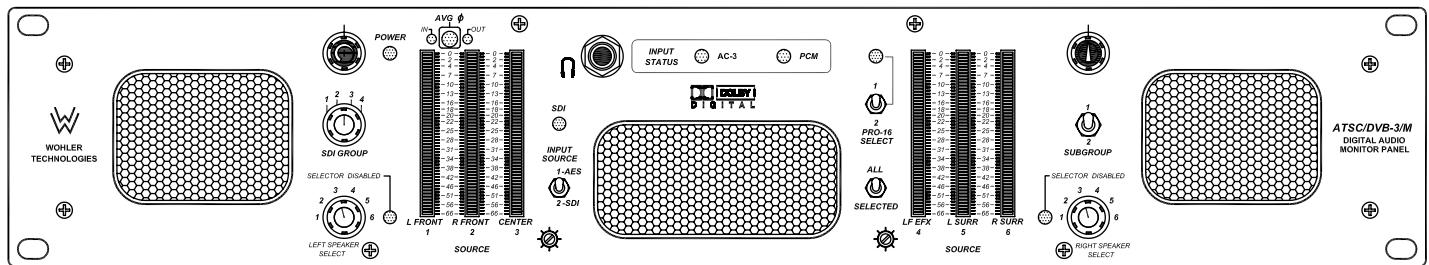
NOTE: Throughout this manual, the following terms are used to refer to **Serial Digital (SDI)** signals:

- **SD-SDI** = refers only to **standard SDI** (270 MB/s).
- **HD-SDI** = refers only to **high-definition SDI** (1.5 GB/s).
- **HD/SD-SDI or SDI** = refers to *either* **standard SDI** (SD-SDI, 270 MB/s) or **high defintion SDI** (HD-SDI, 1.5 GB/s)



ATSC/DVB-3/M

2U Stereo Digital Audio Speaker Monitor



ATSC/DVB-3/M Front Panel

Description

The **ATSC/DVB-3/SDI** is a powered stereo monitor designed specifically for flexible, comprehensive monitoring of the six audio channels associated with ATSC/DVB programming. The unit is 2RU in size, for excellent fidelity without using excessive rackspace in the critical "operating zone" of rack bays and consoles. The **ATSC/DVB-3/M** model features an HD/SD-SDI input and reclocked output on BNC connectors capable of accepting either standard SD-SDI or high definition HD-SDI audio signals, as well as balanced XLR and unbalanced BNC inputs and loop-through outputs for monitoring PCM (Pulse Code Modulation), AES/EBU, and AC-3 (Dolby Digital®) audio signals. HD/SD-SDI group and subgroup selection is set via front panel switches. Two XLR connectors output analog audio of the sources selected for the left and right speaker channels.

The internal speakers and amplifiers are arranged in the popular Wohler "biamp summed bass stereo" configuration: bass frequencies from ALL selected channels are summed into a 20 watt amplifier, which drives the woofer. The two side channel amplifiers and speakers reproduce, in stereo, only the mid- and high-frequencies. Note that the center speaker (the woofer) is NOT a dedicated Center nor LFE speaker. There is also a stereo headphone output, which mutes the speakers while in use.

Six high-resolution wide-range LED bargraph level meters are provided for all six channels for very accurate metering. Fifty-three bi-color segments spanning a range of 65 dB simultaneously display signal levels according to both the PPM and VU standards. Bargraph brightness is adjustable using two recessed trim pots on the front panel.

To isolate possible faults, two rotary switches on the front panel let the operator route any one or pair of inputs independently to left and right speaker channels for acoustic monitoring. A toggle switch is provided for mixing all six channels down to two for listening to all channels at once.

Both Left/Right and Front/Surround "Phase"/Polarity LED indications are provided to alert of possible cancellation from mixdown in any likely playback situation. The unit also features SDI, AC-3, and PCM status indication LEDs, Pro-16 select switch, and power indication LED.

Features

- 2U high: highest fidelity in minimum rackspace
- Monitors HD-SDI or SD-SDI, AC-3 (Dolby Digital), and PCM or AES audio signals
- Simultaneous visual monitoring of all 6 channels
- HD/SD-SDI, AC-3, and PCM or AES Status Indication LEDs
- HD/SD-SDI group select 1-4 and subgroup select 1-2
- Six 53-segment high resolution bargraph level meters
- Bargraph brightness adjust
- Pro-16 signal select switch and indication LED
- Left/Right Front phase indication LEDs
- Select any channel or pair of channels for isolated listening, or a stereo mixdown of all 6 channels
- Selected channel analog outputs on XLR connectors
- Headphone output
- Power indication LED

Applications

The ATSC/DVB-3/M is ideally suited for use in VTR bays, mobile production vehicles, teleconferencing installations, multimedia systems, satellite links and cable TV facilities, and on-air radio studios. Designed and manufactured in the U.S., this unit is backed by a strong warranty and a satisfaction guaranteed return policy.

General Specifications

Input Meter Dynamics:	Simultaneous VU (bar) and PPM (dot)
Peak Acoustic Output (@ 2 ft.):	104 dB SPL
Response, Sixth Octave:	70 Hz - 16 kHz $\pm$ 5 dB (-10 dB @ 40 Hz, 20 kHz)
Power Output, RMS Each Side (4Ω): RMS Bass (4Ω):	20 W transient / 11 W continuous 36 W transient / 20 W continuous
Distortion, Electrical:	Less than 0.2% at any level below limit threshold
Distortion, Acoustic:	6% or less at worst case frequencies above 120 Hz, including cabinet resonance; typically less than 1.5%
Hum and Noise:	Better than -70 dB below full output
Magnetic Shielding:	Less than 1 Gauss any adjacent surface
Input Connectors:	AES: 1x XLR Balanced <u>and</u> 1x BNC Unbal. HD/SD-SDI: 1x Unbalanced BNC
Output Connectors:	AES: 1x XLR-F Loop <u>and</u> 1x BNC Loop HD/SD-SDI: 1x BNC Re-clocked Selected Out: 2x XLR-M
Power Consumption (Average Maximum):	60 W
AC Mains Input:	100-220VAC, 50-60 Hz
"ALL" Channel Summing Assignments*:	Left Side =LFront+LSurr+Center Right Side =RFront+RSurr+Center

* On special order, custom combinations of selected channels are available; either in lieu of, or in addition to, the regular selections.

AC-3 Input Specifications

Input Connector:	BNC, female
Input Impedance:	75 Ω (ohm), unbalanced
Minimum Input level:	250 mV
Playback Mode:	"Line"

PCM and AES/EBU Input Specifications

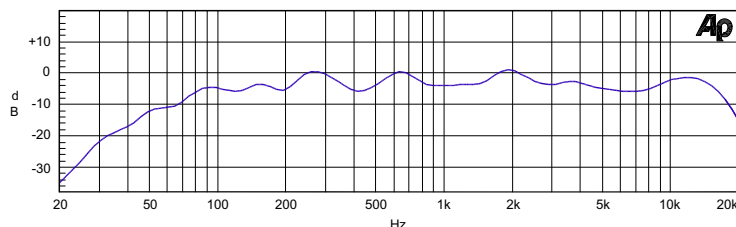
Input Connectors and Impedance:	BNC: 75 Ω (ohm), unbalanced XLR: 110 Ω (ohm) balanced
Conversion Data Width:	20 bit
Dynamic range:	95 dB
Frequency Response:	10 Hz - 20 kHz $\pm$ 0.5 dB
Analog Output Distortion:	< 0.005%
Analog Outputs:	balanced, line-level (-20 dbfs=+4 dBu); minimum load impedance: 10k Ω (ohm)

HD/SD-SDI Input Specifications

HD/SD-SDI Input Connector:	BNC, female
HD/SD-SDI Input Impedance:	75 Ω (ohm), unbalanced
HD/SD-SDI Input Standards Supported:	SMPTE 259M and SMPTE 292M
Audio Sampling Rate:	48 kHz

Note: See Section 3 (page 15) for additional technical information and specifications.

Audio Response Curve



Typical 1/6 Octave Audio Response Curve

Physical Specifications

Weight:	18 lbs. (8.2 kg)
Dimensions (HxWxD):	3.5 x 19 x 12 inches (89 x 483 x 298 mm)

Units are designed to meet, at time of manufacture, all currently applicable product safety and EMC requirements, such as those of CE. 0 dBV ref. 0.775V RMS. Features and specifications subject to improvement without notice.

Installation

Mounting

NOTE: Be sure to set the Input Termination (accessed through the rear panel), BEFORE installing the unit into an enclosed rack or console. See **Item E**, page **12** for setting information.

The unit should be mounted where convenient for operating persons, ideally at approximately ear level for best high frequency response and eye level for best visual observation of the level meters. Its superior magnetic shielding eliminates concerns about locating it adjacent to most types of CRT monitors, including even high-resolution color monitors.

Heat Dissipation

Heat dissipated by the speaker amps is conducted directly to the left side of the chassis; no special considerations for cooling are necessary as long as the ambient temperature inside the rack area does not exceed approximately 40°C (104°F).

Sympathetic Vibration

Sympathetic vibration from other equipment (cables, etc.,) in the rack may be serious enough to interfere with the unit's sound quality out in the listening area. The use of thin card stock and/or felt or foam weather-stripping type materials between adjacent vibrating surfaces, or tying up loose cables, etc., may be required to stop vibrations external to the unit.

Mechanical Bracing

Even though the unit is fairly heavy, the chassis is securely attached to the front panel at eight points along its surface, not just at the four corners of the chassis ears. This feature will reduce or eliminate rear bracing requirements in many mobile/portable applications. The weight of internal components is distributed fairly evenly around the unit.

Audio Connections

Connection of the audio feeds is straightforward. Please refer to the system interconnect block diagram on page **19** for clarification of the general signal paths into and out of the **ATSC/DVB-3/M** unit.

Digital audio inputs are via either BNC or XLR connectors. BNC inputs are 75 Ω unbalanced; XLRs are 110 Ω balanced.

Care should be exercised to avoid mismatched cable types and other similar causes of undesired reflections in RF signal systems. If severe enough, such reflections can result in corruption of the digital datastream. Recommended cable types are as follows:

Recommended cable type for **analog audio** signals is: **Belden 9451** or equivalent.

Recommended cable type for **digital audio** signals is: **Belden 1800B** or equivalent.

AC Power

The unit's AC mains connection is via a standard IEC inlet, with safety ground connected directly to the unit's chassis. The universal AC input (100-240VAC, 50/60Hz) switching power supply is a self-resetting sealed type, with automatic over-voltage and over-current shutdown. There is no user-replaceable fuse in either the primary or secondary circuit.

Section 2

Operation

Front Panel Features

Rear Panel Features

Front Panel Features

Please refer to **Figure-2a** on the following page to familiarize yourself with the front panel features of the ATSC/DVB-3/M unit. The following sections describe these features and are referenced, by number, to **Figure-2a**.

NOTE: Throughout this manual, the following terms are used to refer to **Serial Digital (SDI)** signals:

- **SD-SDI** = refers only to **standard SDI** (270 MB/s).
- **HD-SDI** = refers only to **high-definition SDI** (1.5 GB/s).
- **HD/SD-SDI or SDI** = refers to *either* **standard SDI** (SD-SDI, 270 MB/s) *or* **high definition SDI** (HD-SDI, 1.5 GB/s)

1 Speakers

The internal speaker system is comprised of two mid-range tweeter speakers (*left* and *right*) and one woofer speaker (*middle*). The two side channel speakers reproduce, in stereo, only the mid and high frequencies. Please note that the woofer speaker (*middle*) is *not* a dedicated Center nor LFE speaker.

2 Speaker Select Switches (Left and Right)

Use the *left* switch to select any one of six selected channels for monitoring from the *left* speaker. Use the *right* switch to select any one of six selected channels for monitoring from the *right* speaker.

Note: These two switches are only functional when the **All/Selected Switch (Item 7)** is in the **SELECTED** position. These two switches are NOT functional when the **All/Selected Switch** is in the **ALL** position.

3 Speaker Select Disabled Indication LEDs (Left and Right)

When the **All/Selected Switch (Item 7)** is in the **ALL** position (thus *disabling* the **Speaker Monitor Select Switches**) both of these LEDs will glow RED.

4 Audio Level Meter LED Bargraph Displays (1-6)

Audio levels for source channels **1** through **6** are displayed via these six high-resolution 53-segment LED bargraph display level meters (three on the *left* side of the front panel; three on the *right* side). Dynamic range for these meters is **65 dB** and they are able to display signal levels using both **PPM** and **VU** standards. Each meter is labeled according to the standard **Surround Sound** nomenclature (left front, right front, center, low frequency effects, left surround, and right surround). See page **18** for more information about these level meters.

5 Bargraph Brightness Trim Pot (Left and Right)

These two trim pots are recessed into the front panel and can be accessed using a small screwdriver. Turning either trim pot *clockwise* will increase the relative brightness of the associated bargraph display LED segments. The *left* trimpot affects the *left* three bargraph displays (**1-3**); the *right* trim pot affects the *right* three bargraph displays (**4-6**).

6 Input Source Select Switch

This 2-position toggle switch allows the operator to choose between two possible input sources (**1-AES** or **2-SDI**) for monitoring through the unit. Choosing **1-AES** selects the **AC-3** or **PCM/AES** signals entering the **Source 1** connectors on the rear panel (See **Items C and D**, page **12**). Choosing **2-SDI** selects an **AC-3** or **PCM/AES** source that is de-embedded from the **HD/SD-SDI** signal entering the **Source 2** BNC connector on the rear panel (see **Item F**, page **12**).

7 All/Selected Switch

When this 2-position toggle switch is in the **ALL** position, a stereo mixdown of the five full channels is applied to the speaker amps (the LFE channel is excluded). In this position both the *left* and *right* **Speaker Select Switches (Item 2)** are disabled and the **Speaker Select Disabled Indication LEDs (Item 3)** will glow RED.

When this switch is in the **SELECTED** position, channel selection defaults to the settings as selected by the *left* and *right* **Speaker Select Switches (Item 2)** and the *left* and *right* **Speaker Select Disabled Indication LEDs (Item 3)** will be unlit.

8 SDI Group Select Switch

This 4-position rotary switch allows the operator to choose **HD/SD-SDI GROUP 1, 2, 3, or 4** for monitoring. The *Subgroup* (**1** or **2**) of each **HD/SD-SDI GROUP** is selected using the **SDI Subgroup Select Switch (Item 17, page 10)**.

Note that the **Input Source Select Switch (Item 6)** must be set to **2-SDI** in order for the selected **HD/SD-SDI** signals to be actively monitored.

9 Volume Control Pot

This controls the loudness of the audio reproduced by the internal speakers or connected headphone. Clock-wise rotation of this control increases the loudness of the monitored audio.

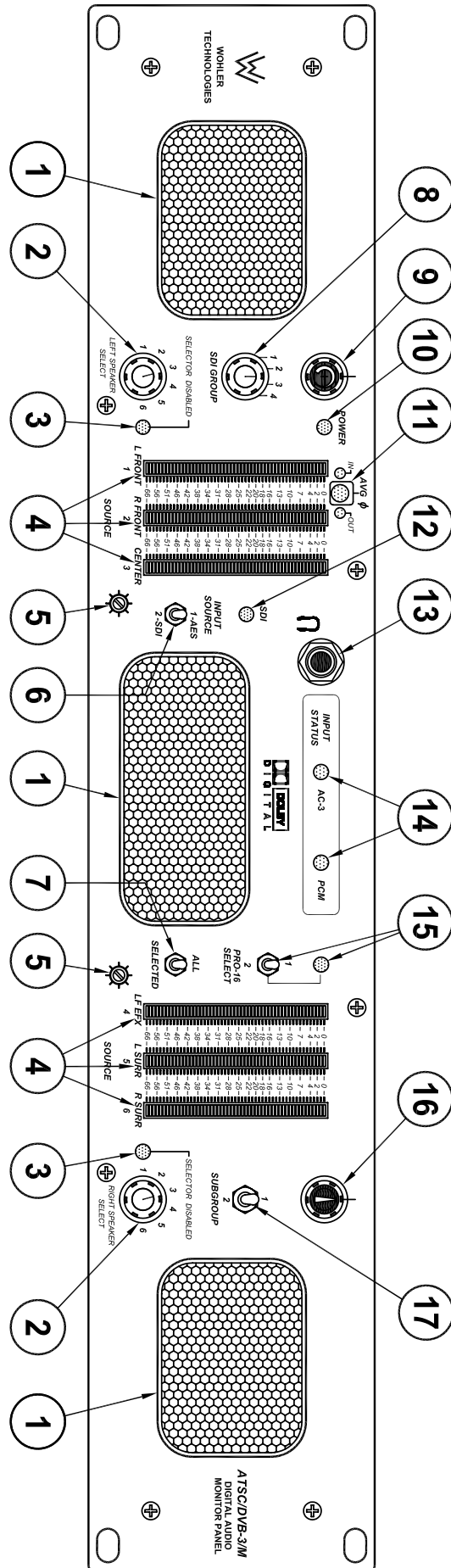


Figure-2a: Front Panel Features

Front Panel Features

10 Power Indication LED

This LED signals the operating condition of the power supply. The LED glows GREEN to indicate the unit is connected to mains power and an operation voltage is present.

11 Phase Indication LEDs

These three LEDs indicate the instantaneous and average phase (polarity) conditions between the source(s) assigned to the left speaker channel and the source(s) assigned to the right speaker channel. The larger LED labeled **AVG** indicates the *average* phase condition between the left and right speaker channels. The two smaller LEDs labeled **IN** and **OUT** indicate the *instantaneous* phase relationships. Indication is as follows:

- The small *left* LED (**IN**) glows (or blinks) GREEN for *in-phase* signals.
- The small *right* LED (**OUT**) glows (or blinks) AMBER for *out-of-phase* signals.
- The large *center* **AVG** LED indicates the *average* phase condition by glowing GREEN for *in-phase* signals, or RED for *out-of-phase* signals.

In general, observing the **AVG** LED alone is sufficient for proper phase monitoring. While it is normal for stereo signals to contain some intermittent instantaneous *out-of-phase* and *in-phase* conditions (**IN** and **OUT** LEDs), a steady RED glow of the **AVG** LED indicates an *out-of-phase* alarm condition.

12 SDI Signal Status Indication LED

This LED will indicate the status of any SDI signal entering **Source 2** regardless of any monitor selection settings. This LED shows the following conditions:

- **OFF:** No valid HD/SD-SDI signal is present.
- **GREEN:** A valid HD/SD-SDI signal is present.
- **RED:** The HD/SD-SDI signal is not properly *received*.

13 Headphone Jack

Select the headphone audio sources as you would for the internal speakers. When you plug in headphones, the speakers will mute. This jack accepts a standard 1/4" phone type stereo plug.

14 AC-3 and PCM Input Status Indication LEDs

These two green LEDs indicate which kind of signal is being received at the **Source 1** inputs. When an AC-3 signal is being monitored from **Source 1** inputs, the *left* AC-3 LED will glow GREEN. When a PCM or standard AES/EBU signal is being monitored from the **Source 1** inputs, the *right* PCM LED will glow GREEN.

15 Pro-16 Selection Switch and Indication LED

In the event that you are processing two different **Dolby Digital Pro-16** data streams it is possible to select between the two with this toggle switch. The LED will glow AMBER if such signals are present. In the absence of such data streams, the LED will *not* be lit and the switch will be nonfunctional.

16 Balance Control Pot

This control pans the volume balance between the *left* and *right* speakers.

17 SDI Subgroup Select Switch (1 or 2)

This 2-position toggle switch allows the operator to choose whether the unit will monitor **Subgroup 1** (channels 1 and 2) or **Subgroup 2** (channels 3 and 4) of the chosen HD/SD-SDI Group (1, 2, 3, or 4) as selected by the SDI Group Select Switch (Item 8, page 8). **Subgroup** selection chooses the channels to be monitored from the selected SDI Group as follows:

Subgroup 1 = Channels 1 and 2 **Subgroup 2** = Channels 3 and 4

Note that the **Input Source Select Switch** (Item 6) must be set to **2-SDI** in order for the selected HD/SD-SDI signals to be actively monitored.

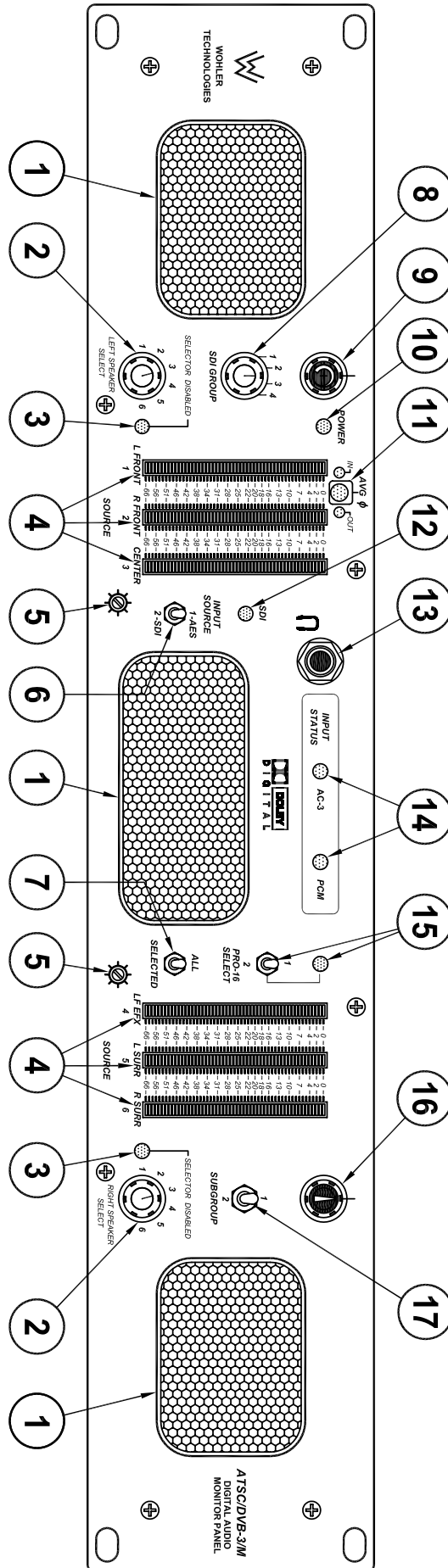


Figure-2a: Front Panel Features

Rear Panel Features

Please refer to **Figure-2b** on the following page to familiarize yourself with the rear panel features of the ATSC/DVB-3/M unit. The following sections describe these features and are referenced, by letter, to **Figure-2b**.

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- **HD/SD-SDI or SDI** = refers to *either* **standard SDI** (SD-SDI, 270 MB/s) *or* **high definition SDI** (HD-SDI, 1.5 GB/s)

A Power Connector

Attach the supplied **IEC-320** power cord between this connector and mains power (**100 - 240VAC nominal, 50/60 Hz**). The front panel **Power Indication LED** (**Item 10**, page **10**) will glow GREEN to indicate operating voltages are present.

B Option DIP Switch Module

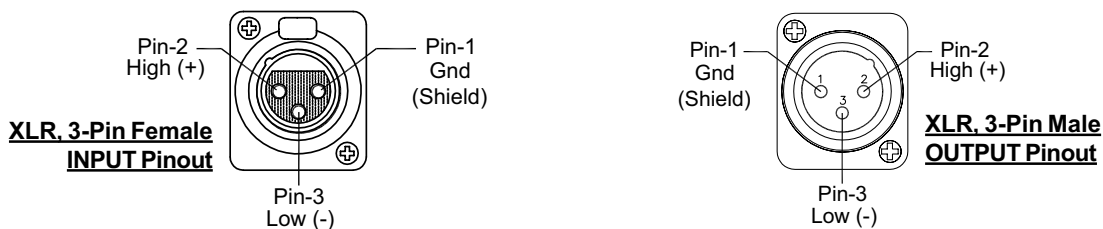
This DIP switch is reserved for possible options still to be determined. You may disregard its settings.

C Source 1 - AC-3 Balanced Input and Loop-Through Connectors

The **BALANCED IN** connector (3-pin female XLR) accepts either **AC-3** (Dolby Digital®) or standard **PCM** or **AES** signals and is configured for *balanced* **110 Ω** impedance connections. See diagram below for pinout information.

The **BALANCED LOOP** connector (3-pin male XLR) outputs a copy of the signal entering either the **BALANCED IN** *or* **UNBAL IN** (**Item D**) input connector (whichever one is used). See diagram below for pinout information.

NOTE: Refer to the **Input Source Select Switch** description (**Item 6**, page **8**) for how to select this input for monitoring.



D Source 1 - AC-3 Unbalanced Input and Loop-Through Connectors

The **UNBAL IN** connector (*female* BNC) accepts either **AC-3** (Dolby Digital®) or standard **PCM** or **AES** signals and is configured for *unbalanced* **75 Ω** impedance connections.

The **UNBAL LOOP** connector (*female* BNC) outputs a copy of the signal entering either the **BALANCED IN** (**Item C**) *or* **UNBAL IN** input connector (whichever one is used).

NOTE: Refer to the **Input Source Select Switch** description (**Item 6**, page **8**) for how to select this input for monitoring.

E Termination DIP Switch Module

In the event that signals entering the **Source 1** inputs (**Item C** or **D**) are connected to downstream equipment, then DIP switch section **1** of this module should be set to **UNTERMINATED (UP)**. If there is *no* connection to downstream equipment, then section **1** should be set to **TERMINATED (DOWN)**.

NOTE: Section **2** of this DIP switch is *not* functional.

F Source 2 - HD/SD-SDI Input and Output Connectors

The **(HD)SD-SDI IN** connector (*female* BNC) accepts *either* standard **SD-SDI** audio signals (**270 MB/s**) *or* *high definition* **HD-SDI** (**1.5 GB/s**).

Refer to the **Input Source Select Switch** description (**Item 6**, page **8**) for how to select this input for monitoring. Refer to the **SDI Group Select Switch** (**Item 8**, page **8**) and **SDI Subgroup Select Switch** (**Item 17**, page **10**) descriptions for how to select **HD/SD-SDI** groups and sub-groups for monitoring.

The **(HD)SD-SDI OUT** connector (*female* BNC) outputs a re-clocked (regenerated) **HD/SD-SDI** signal copy derived from the **HD/SD-SDI** input. This output functions regardless of other selection settings. This feature enables output of the re-clocked **HD/SD-SDI** signal independent of the units other monitoring functions (as long as a valid **HD/SD-SDI** signal is present at the input).

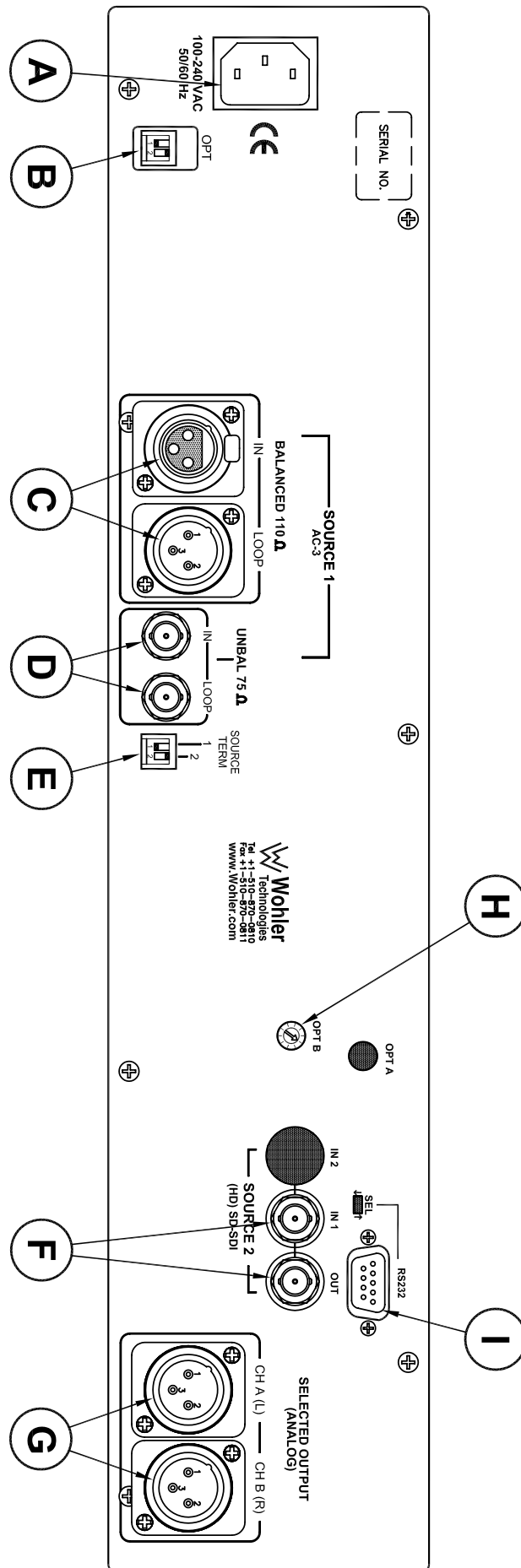


Figure-2b: Rear Panel Features

Rear Panel Features

G Selected Output (Analog) Connectors (Chan.A/Left and Chan.B/Right)

The two **SELECTED OUTPUT (ANALOG)** connectors (3-pin male XLR) are **analog** outputs of the input signals as selected for active monitoring through the *left* and *right* speakers (or headphones). The *left* **CH.A(L)** connector outputs the *left* speaker channel (channel **A**) and the *right* **CH.B(R)** connector outputs the *right* speaker channel (channel **B**). Both connectors are configured for low impedance connections and the output signals are at unity gain with the input level and are *not* affected by the units **Volume** and **Balance** controls or **Headphone Mute** feature. For XLR connector pinout information, see the diagram under **Item C**, page 12.

H OPT Mode Select Switch

This recessed 10-position rotary switch sets the mode of operation. When set to position **0**, the unit is configured to download programing information. When set to positions **1** through **9**, the unit will operate normally. See below for setting information.

Position	Function
0	Program Download
1-9	Operate

I RS232 Connector

This DB-9 connector is used for downloading programming, setup, and diagnostic information into and out of the **919212 audio de-embedder**.

Section 3

Technical Information

General Technical Observations

Level Meter Specifications

ATSC/DVB-3/M Interconnect Block Diagram

NOTE:

PCB layout and schematic support documentation is available upon request.

General Technical Observations

General Mechanical Observations

Elimination of cabinet and component sympathetic vibrations (resonances) requires considerable attention to mechanical details. Because of this, and the physical constraints of the speaker's acoustic enclosures, even minor changes to any of the mechanical details of the unit can seriously impair its acoustic performance. This especially applies to the speaker baffles. If mechanical work on the unit is necessary, be sure to make adequate notes to permit accurate reassembly.

Unfortunately, the unusual and wholly proprietary method of magnetic shielding is usually degraded slightly by any disassembly of the unit, except removal of the rear panel. Almost any maintenance or repair will require removal of the cover. If an immediately adjacent video monitor shows magnetic interference after reassembly of the unit, it must be returned to the factory to restore the shielding completely.

General Audio Circuitry Observations

Since a single-sided power supply is used, all amplifier sections are "biased" with a 1/2 supply reference, so all opamp signal terminals on the main board should have a DC level of +12V, +/-0.7V. Signal inputs to the main audio board from any of the input select circuits are via the balanced input stage, in lieu of the XLR analog inputs on the basic unit. Signal feed points for level meters and the phase indicator are immediately after the input stage, and before the volume control section. The signal pick-off for the headphones is after the volume and balance controls. Speaker muting is controlled by circuitry that senses connection of headphones to the jack.

The power amps are attached to an aluminum heatsink plate (which is also connected to the circuit common for these devices). The heatsink plate forms an operational module separate from the chassis, which allows access to the solder side of the circuit board while power is applied to the circuitry. To avoid thermal shutdown of the power amp(s), they should NOT be operated without their tabs being fastened to the heatsink plate.

Variations in the frequency response of different production runs of drivers sometimes requires minor adjustments in the equalization/crossover components in individual runs of units. Some of these components may have values slightly different than those indicated in the schematic, which are the nominal ones. If any of the drivers (speakers) are replaced, it may be helpful to change some of these components to achieve maximum flatness of response.

The operating threshold of the woofer limiter is critical to both satisfactory reproduction of musical transients and preventing damage to, or destruction of, the speaker itself. The side speaker output limiter circuits are similarly important, though not as critically adjusted.

The woofer power amps are arranged in a bridge configuration; care must be taken to avoid letting EITHER speaker terminal contact the chassis (common) OR THE GROUNDED LEAD OF ANY TEST EQUIPMENT so as not to short out the power amps. The side speaker outputs are single-ended, so these precautions are not necessary for them.

Level Meter Specifications

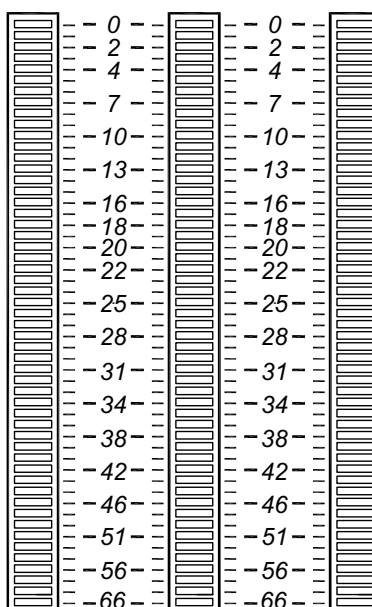
Description

The 53-segment type of tri-color LED bargraph display has a total length of **2.24" (56.8 mm)** and uses relatively small segments. This high resolution segment size is easy to accurately visually monitor for distances up to **six feet (1.8 meters)**. Segment size is **0.158" (4 mm) x 0.04" (1 mm)**. Segment pitch is **0.039" (0.99 mm)**.

Each LED bargraph display section visually indicates the dynamic changes within the audio signal source(s) being monitored. All bargraph LED segments are of the tri-color type (green, amber, red). Ballistics for these meters are factory set to display a single floating **PPM 'dot'** (continuous decay of **20 dB** in **1.5 seconds**) above a **VU bar**; each segment's color being fixed according to its position on the scale. Level gain is factory set at **+4 dBu**. Dynamic range for these meters is **65 dB**.

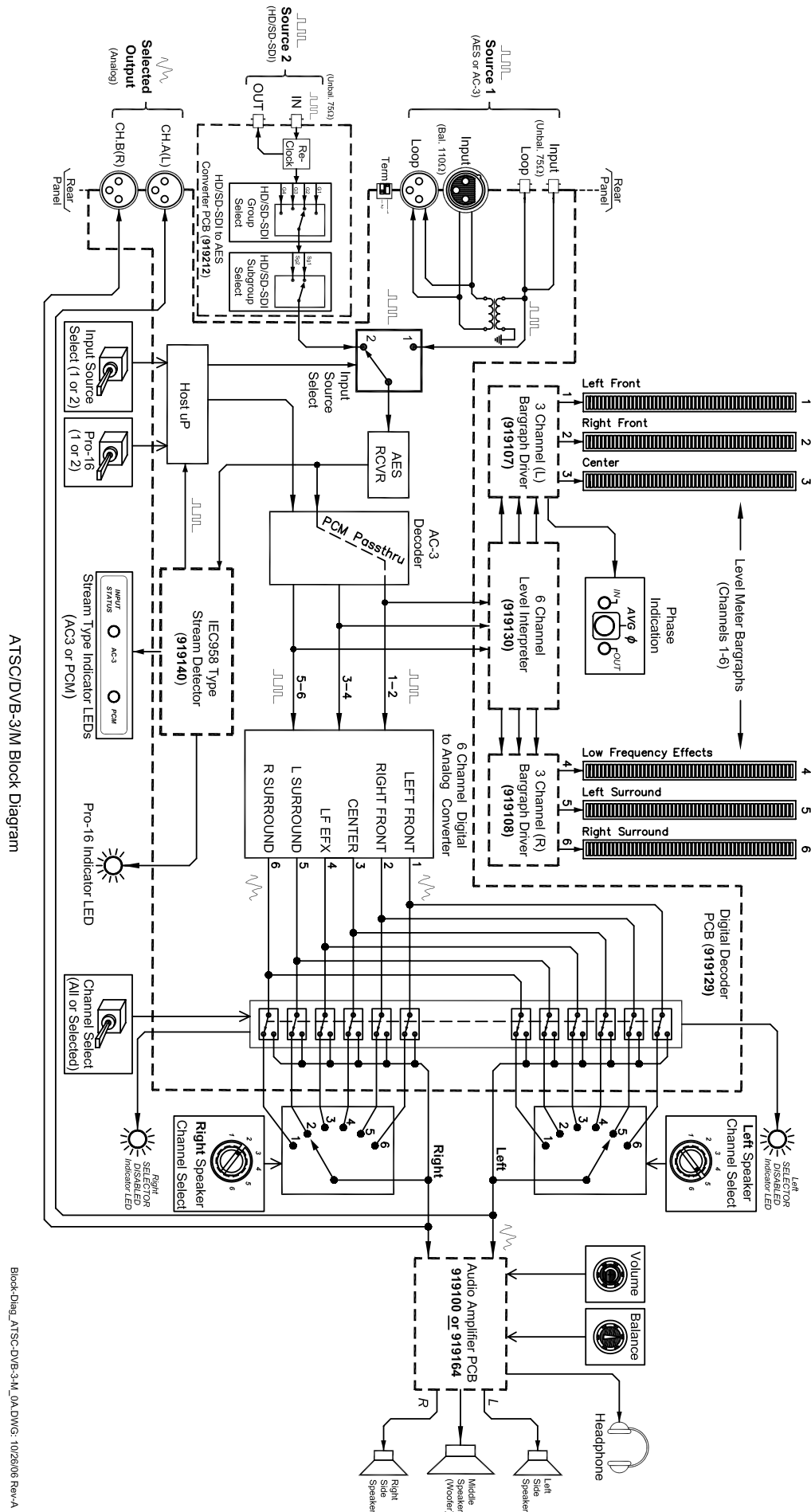
Scales

Please refer to the figure below for an illustration showing the standard scale for the 53-segment bargraph display used in the **ATSC/DVB-3/M** digital audio monitor. Custom variations of this scale are also available by special order.



LED Bargraph Level Meter Specifications

Level meter type:	LED bargraph
Segment quantity:	53
Level Meter Scale:	0 to -66 dB
Dynamic Range:	65 dB
Midscale Resolution:	1 dB
Bargraph Length:	2.22" (56.4 mm)
LED segment size:	0.14" x 0.028" (3.57 x 0.7 mm)
LED segment pitch:	0.041" (1.05 mm)
Segment display color:	Tri-color (red, amber, green)
Peak emission wavelength:	Green: 570 nm, Red: 630 nm
Segment brightness, (If = 20 mA):	3.5 mcd
Segment brightness, uniformity:	<10% difference between segments
Adjacent segment "Off" brightness:	<1% of brightness of active segment



ATSC/DVB-3/M Interconnect Block Diagram

NOTES:

NOTE:

PCB layout and schematic support documentation is available upon request.



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